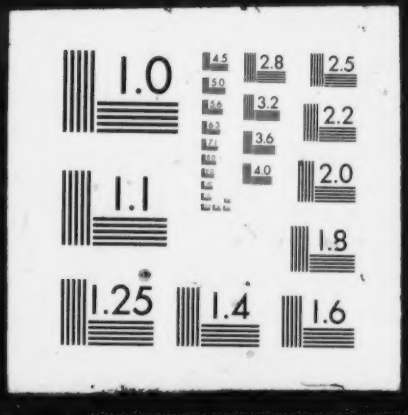
1 OF 1
PB84
104 801

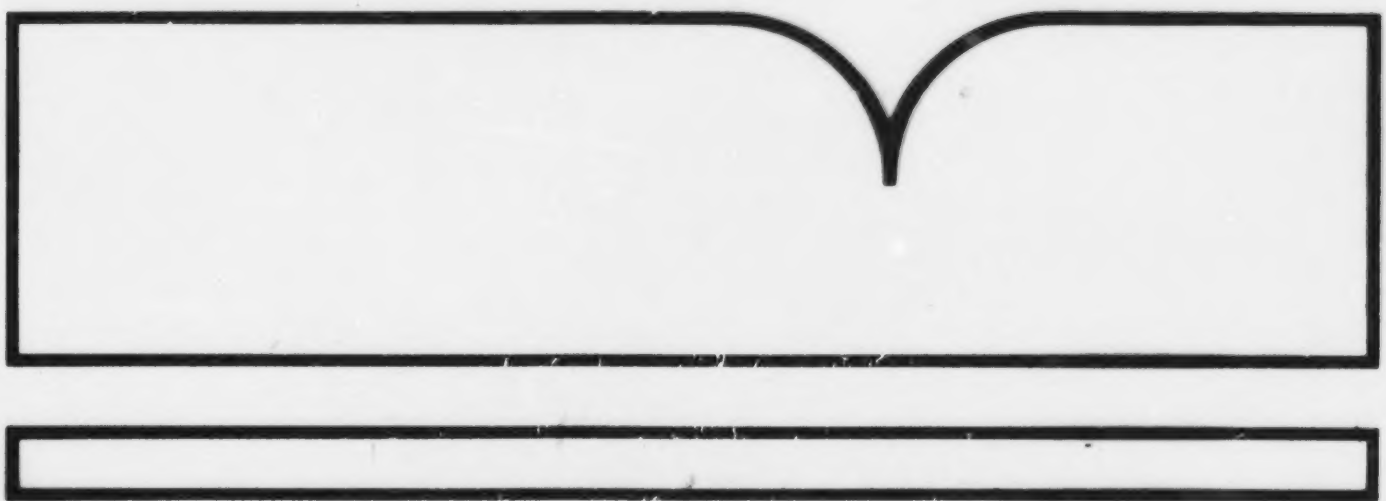


PB84-104801

Environmental Radiation Data
Report 31, July-September 1982

(U.S.) Office of Radiation Programs
Washington, DC

Sep 82



U.S. Department of Commerce
National Technical Information Service
NTIS

PB84-104801

United States
Environmental Protection
Agency

Office of
Radiation Programs
Washington DC 20460

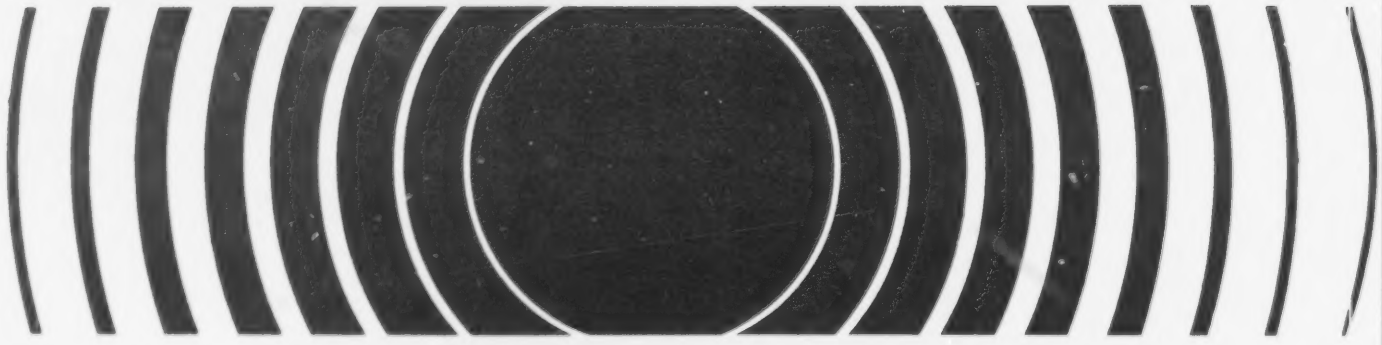
EPA 520/5-83-014
December 1982

Radiation

EPA

Environmental Radiation Data Report 31

(July - September 1982)



REPRODUCED BY
NATIONAL TECHNICAL
INFORMATION SERVICE
U.S. DEPARTMENT OF COMMERCE
SPRINGFIELD, VA. 22161

TECHNICAL REPORT DATA

(Please read Instructions on the reverse before completing)

1. REPORT NO.	2.	3. RECIPIENT'S ACCESSION NO.
520/5-83-014		PB84 104801

4. TITLE AND SUBTITLE	5. REPORT DATE
Environmental Radiation Data Report 31 July - September 1982	Sept. 1982
	6. PERFORMING ORGANIZATION CODE
7. AUTHOR(S)	8. PERFORMING ORGANIZATION REPORT NO.
9. PERFORMING ORGANIZATION NAME AND ADDRESS Same as box 12	10. PROGRAM ELEMENT NO.
	11. CONTRACT/GRANT NO.
12. SPONSORING AGENCY NAME AND ADDRESS U.S. Environmental Protection Agency 401 M Street, S.W. Washington, D.C. 20460	13. TYPE OF REPORT AND PERIOD COVERED
	14. SPONSORING AGENCY CODE

15. SUPPLEMENTARY NOTES

16. ABSTRACT

Environmental Radiation Data (ERD) is compiled and distributed quarterly by the Office of Radiation Programs Eastern Environmental Radiation Facility (EERF), Montgomery, Alabama. Data from the similar networks operated by contributing States, Canada, Mexico, and the Pan American Health Organization are reported in (ERD) when available. The ERAMS is comprised of nationwide sampling stations that provide air, surface and drinking water and milk samples from which environmental radiation levels are deprived. The major emphasis for ERAMS is toward identifying trends in the accumulation of long-lived radionuclides in the environment. The radiation analyses for fission products and specific analyses for uranium, plutonium, strontium, iodine, radium, krypton and tritium. This monitoring effort also serves to provide ancillary information on releases into the environment from stationary sources such as nuclear power reactors, fuel fabrication and reprocessing plants and natural background levels.

17. KEY WORDS AND DOCUMENT ANALYSIS

a. DESCRIPTORS	b. IDENTIFIERS/OPEN ENDED TERMS	c. COSATI Field/Group

18. DISTRIBUTION STATEMENT	19. SECURITY CLASS *(This Report)*	21. NO. OF PAGES
unlimited	unclassified	
	20. SECURITY CLASS *(This page)* unclassified	22. PRICE

EPA Form 2220-1 (Rev. 4-77) PREVIOUS EDITION IS OBSOLETE

E N V I R O N M E N T A L

R A D I A T I O N

D A T A

REPORT 31

APRIL 1983

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY

Office of Radiation Programs

Preface

Environmental Radiation Data (ERD) is compiled and distributed quarterly by the Office of Radiation Programs' Eastern Environmental Radiation Facility (EERF), Montgomery, Alabama. Data from the Environmental Radiation Ambient Monitoring System (ERAMS), and similar networks operated by contributing States, Canada, Mexico, and the Pan American Health Organization are reported in (ERD) when available.

ERAMS was established in 1973 by the U. S. Environmental Protection Agency's Office of Radiation Programs (ORP). The ERAMS is comprised of nationwide sampling stations that provide air, surface, and drinking water and milk samples from which environmental radiation levels are derived. The major emphasis for ERAMS is toward identifying trends in the accumulation of long-lived radionuclides in the environment.

1. Sampling locations are selected to provide optimal population coverage while functioning to monitor fallout from nuclear devices and other forms of radioactive contamination of the enviromnent.

2. The radiation analyses performed on these samples include gross alpha and gross beta levels, gamma analyses for fission products and specific analyses for uranium, plutonium, strontium, iodine, radium, krypton and tritium. This monitoring effort also serves to provide ancillary information on releases into the environment from stationary sources such as nuclear power reactors, fuel fabrication and reprocessing plants and natural background levels.

ENVIRONMENTAL RADIATION DATA

CONTENTS

	Page
DATA - Reporting Rationale and Procedures	iii
- Table of Reporting Increments and Minimum Detectable Levels	v
DATA - ERAMS	
SECTION I. Air Program	1
1. Airborne Particulates and Precipitation	1
2. Plutonium and Uranium in Airborne Particulates and Precipitation	10
3. Krypton-85	13
SECTION II. Water Program	15
1. Surface Water	15
2. Drinking Water	20
3. Radon in Drinking Water	24
SECTION III. External Gamma Ambient Monitoring Program	37

SECTION IV. Milk Program 40

1. Pasteurized Milk 40

2. Tritium in Milk 40

4. Carbon-14 in Milk 41

DATA - STATE AGENCIES 49

1. Indiana Pasteurized Milk Program 49

2. Iowa Water Analysis and Milk Analysis 50

The intent of EPA's Office of Radiation Programs in establishing the Environmental Radiation Ambient Monitoring System was to provide continuous, accurate and usable environmental radiation data for the public. Therefore, new data reporting procedures were developed to allow better interpretation of the data. The most significant change in this reporting procedure is that all specific radionuclide analyses will be reported as the counting results indicate, whether the number is negative, zero, or positive.

Reporting Rationale

Frequently, concentrations of a radionuclide in environmental media are close to zero. When the actual concentration of a nuclide is zero, the net counting results should statistically show a distribution of negative and positive numbers about zero. This occurs when the background count is subtracted from a sample which has only background activity. Prior to July 1975, ERAMS data were not reported numerically when the results were less than a specified reporting level or minimum detectable level. The present reporting procedure allows all the data to be reported and evaluated statistically without an arbitrary cutoff of small or negative numbers. This approach will facilitate estimates of bias in the nuclide analyses and will allow better evaluation of distributions and trends in environmental data.

When reviewing the data in this report, caution should be exercised in the interpretation of individual negative values. Obviously, a negative activity value does not have physical significance. Such numbers, however, are significant when taken together with other observations which indicate that the true value of a distribution is near zero. When an average of several measurements produces a result less than zero, this indicates a negative bias in the measurement procedure.

(1) Reported Values

Specific Analyses - All specific radionuclide analyses will be reported as the counting results indicate, whether the number is negative, zero, or positive. Numerical values given are as of sample collection date.

Gross Analyses - The actual value of gross radioactivity measurements will be reported, unless the value is below the minimum detectable level (MDL) at the 2 sigma confidence level, then < minimum detectable level will be reported.

MDL is defined as the 3 sigma error of the background. A tabulation of MDL's is given in the following table.

(2) Reported Error Terms

Each reported value for specific analyses will be accompanied by a counting error term at the 2 sigma (95%) confidence interval. Potassium concentrations are determined by specific activity analyses. Error terms are therefore reported as counting errors. At the very low levels characteristic of most ERAMS measurements, counting error is the greatest contributor to overall error.

(3) Significant Figures

All reported values will be rounded to no more than three significant figures. The last significant figure will be increased by one if the figure following is five or greater, otherwise it is left unchanged.

(4) Reporting Levels

The reporting units, smallest increments for reporting, and minimum detectable levels for each isotope are shown in table 1. Smallest increments are sometimes considerably smaller than minimum detectable amounts to avoid truncation errors in averaging.

(5) Averages

Averages will be calculated along with appropriate error terms in an annual summary and analysis of ERAMS data. In calculating these averages, all values of individual data including negative numbers will be utilized. Averages will not be included in ERD quarterly reports.

TABLE 1

ERAMS Reporting Increments and Minimum Detectable Levels

for Radionuclide Analyses

Radionuclide	Media	Reporting Units	Reporting Increments	Minimum Detectable Levels
Gross alpha	Water	pCi/l	1 pCi/l	2 pCi/l
Gross beta	Air	pCi/m^3	.01 pCi/m^3	.01 pCi/m^3
	Water	pCi/l	1 pCi/l	1 pCi/l
	Precipitation	nCi/m^2	.01 nCi/m^2	.01 $nCi/m^{2(a)}$
Tritium	Water	nCi/l	.1 nCi/l	.2 nCi/l
	Milk	nCi/l	.1 nCi/l	.2 nCi/l
Carbon-14	Milk	pCi/l	1 pCi/l	15 pCi/l
Krypton-85	Ambient Air	pCi/m^3	.1 pCi/m^3	2 pCi/m^3
Plutonium-238, 239	Air	aCi/m^3	.1 aCi/m^3	.015 $pCi^{(b)}$ per sample
	Milk	pCi/l	.001 pCi/l	.015 pCi per sample
	Water	pCi/l	.001 pCi/l	.015 pCi per sample
Uranium-234, 235,238	Air	aCi/m^3	.1 aCi/m^3	.015 $pCi^{(b)}$ per sample
	Milk	pCi/l	.001 pCi/l	.015 pCi per sample
	Water	pCi/l	.001 pCi/l	.015 pCi per sample
Radium-226	Water	pCi/l	.1 pCi/l	.1 pCi/l
Strontium-90	Milk	pCi/l	.1 pCi/l	1 pCi/l
	Water	pCi/l	.1 pCi/l	1 pCi/l

Radionuclide	Media	Reporting Units	Reporting Increments	Minimum Detectable Levels
Strontium-89	Milk	pCi/l	1 pCi/l	5 pCi/l[c]
Iodine-131	Milk	pCi/l	1 pCi/l	10 pCi/l[c]
	Water	pCi/l	1 pCi/l	10 pCi/l[c]
	Water (specific radiochemical analysis)	pCi/l	.1 pCi/l	.4 pCi/l
Iodine-129	Milk	fCi/l	.1 fCi/l	.4 fCi/l
Iodine-127	Milk	g/l	10 g/l	10 g/l
Cesium-137	Milk	pCi/l	1 pCi/l	10 pCi/l
	Water	pCi/l	1 pCi/l	10 pCi/l
Barium-140	Milk	pCi/l	1 pCi/l	10 pCi/l[c]
	Water	pCi/l	1 pCi/l	10 pCi/l[c]
Potassium	Milk	g/l	.1 g/l	.12 g/l
	Water	g/l	.1 g/l	.12 g/l
Potassium-40	Water	pCi/l	1 pCi/l	100 pCi/l

(a) The value in terms of nCi/m^2 would be dependent on precipitation (mm).
(b) This value in terms of pCi/m^3 would be dependent on the air volume.
(c) Activity as of the day of counting.

ENVIRONMENTAL RADIATION AMBIENT MONITORING SYSTEM (ERAMS)

SECTION I. Air Program

Airborne Particulates and Precipitation

Gross beta radioactivity measurements and certain specific analyses are performed on air particulates and precipitation samples as indicator measurements in assessing the general (national) impact of all contributing sources on environmental levels of radiation.

Airborne particulates are collected continuously at field stations representing wide geographic coverage, including present and potential sources of environmental radioactivity. Sampling sites are located throughout the United States, Virgin Islands, and the Panama Canal.

Filters (10-cm diameter synthetic fiber) from air samplers are changed twice weekly and field measurements are made with a G-M survey meter at 5 hours and 29 hours after collection to allow for radon and thoron daughter product decay. Field estimates are reported to appropriate EPA officials by telephone or mail depending on the activity levels found.

The filters are sent to EERF for more sensitive analyses in a low background beta counter. Gamma scans are performed on all filters showing laboratory gross beta counts greater than 1 pCi/m^3. The lower gross beta values reported for laboratory measurements are largely due to the decay of radionuclides which occurred between the times of the field estimates and laboratory measurements.

Precipitation samples are collected at the field stations where air filters are collected. These samples are also sent to EERF where they are composited monthly for tritium, gross beta activity measurements and gamma scans.

These locations also correspond to airborne particulate and drinking water sampling locations selected for plutonium analyses. Plutonium-238, -239, and uranium-234, -235, and -238 analyses are performed annually on precipitation samples collected during March - May.

Tables 2 - 4 present the monthly average gross beta concentrations in airborne particulates for July - September 1982.

Tables 5 - 7 present the monthly average gross beta concentration in precipitation for July - September 1982.

The specific gamma results will be published when they are available. A compilation of individual measurements is available from the EPA, EERF, Montgomery, AL 36193.

The tritium in precipitation samples for July - September 1982 at the selected stations are shown in Table 8.

TABLE 2

AIRBORNE PARTICULATES
GROSS BETA CONCENTRATION
JULY 1982

LOCATION	# SAM	AIRBORNE PARTICULATES 5-HR FIELD ESTIMATE MAX	MIN	AVG	EERF LAB MEASUREMENT MAX	MIN	AVG
		(pCi/m^3)			(pCi/m^3)		
AL:MONTGOMERY	9	0.9	0.2	0.4	0.01	0.00	0.01
CA:BERKELEY	9	0.1	0.0	0.1	0.01	0.00	0.01
CA:LOS ANGELES	9	0.8	0.2	0.4	0.02	0.01	0.01
CT:HARTFORD	9	0.4	0.1	0.2	0.01	0.01	0.01
DE:WILMINGTON	7	0.7	0.0	0.2	0.01	0.01	0.01
FL:JACKSONVILLE	8	0.1	0.0	0.1	0.01	0.00	0.01
FL:MIAMI	9	0.1	0.0	0.0	0.01	0.00	0.01
HI:HONOLULU	9	0.1	0.0	0.0	0.02	0.00	0.01
IA:IOWA CITY	9	1.1	0.0	0.3	0.03	0.01	0.01
ID:BOISE	9	0.5	0.1	0.3	0.02	0.01	0.01
ID:IDAHO FALLS	9	NM	NM	NM	0.02	0.01	0.01
IL:CHICAGO	9	0.6	0.1	0.3	0.02	0.01	0.01
KS:TOPEKA	5	1.3	0.1	0.5	0.03	0.00	0.01
ME:AUGUSTA	9	0.5	0.1	0.2	0.02	0.01	0.01
MI:LANSING	9	0.6	0.2	0.3	0.04	0.01	0.03
MN:MINNEAPOLIS	9	0.6	0.1	0.3	0.02	0.01	0.01
MO:JEFFERSON CITY	9	1.1	0.2	0.4	0.05	0.01	0.02
MS:JACKSON	9	0.5	0.2	0.3	0.03	0.01	0.02
NC:CHARLOTTE	3	0.3	0.1	0.2	0.06	0.01	0.03
ND:BISMARCK	6	0.7	0.1	0.4	0.02	0.01	0.01
NH:CONCORD	9	7.4	0.7	3.1	0.01	0.00	0.01
NJ:TRENTON	9	0.6	0.1	0.3	0.01	0.00	0.01
NV:LAS VEGAS	9	1.1	0.3	0.6	0.02	0.01	0.01
NY:ALBANY	9	0.4	0.1	0.2	0.02	0.01	0.01
NY:NEW YORK CITY	9	0.2	0.1	0.1	0.02	0.01	0.01
NY:NIAGARA FALLS	9	0.7	0.1	0.2	0.01	0.00	0.01
NY:SYRACUSE	9	1.7	0.1	0.5	0.02	0.01	0.01
OH:COLUMBUS	9	1.1	0.3	0.6	0.02	0.01	0.02
OH:PAINESVILLE	9	0.6	0.2	0.4	0.03	0.01	0.01
OH:TOLEDO	9	0.8	0.1	0.4	0.02	0.01	0.02
OK:OKLAHOMA CITY	4	0.6	0.3	0.4	0.01	0.01	0.01
OR:PORTLAND	9	NM	NM	NM	0.02	0.00	0.01
PA:HARRISBURG	12	1.7	0.2	0.9	0.02	0.01	0.02
PA:PITTSBURGH	9	0.4	0.2	0.3	0.02	0.01	0.01
RI:PROVIDENCE	7	0.3	0.1	0.2	0.02	0.01	0.01
SC:BARNWELL	3	0.1	0.0	0.0	0.01	0.00	0.01
SC:COLUMBIA	9	0.6	0.1	0.3	0.03	0.01	0.01
SD:PIERRE	9	1.9	0.2	0.7	0.02	0.01	0.02
TX:AUSTIN	9	1.4	0.8	1.0	0.04	0.01	0.02
TX:EL PASO	8	0.9	0.3	0.6	0.02	0.01	0.01
VA:LYNCHBURG	9	1.1	0.2	0.6	0.02	0.01	0.01
WA:SEATTLE	9	0.1	0.0	0.0	0.01	0.00	0.00
WA:SPOKANE	9	0.5	0.2	0.3	0.02	0.01	0.01
WI:MADISON	9	1.8	0.1	0.4	0.01	0.00	0.01
WY:CHEYENNE	1	1.0	0.2	1.0	0.01	0.01	0.01

MINIMUM DETECTABLE LIMIT FOR FIELD ESTIMATES - .1 pCi/m^3
MINIMUM DETECTABLE LIMIT FOR LAB MEASUREMENT - .01 pCi/m^3

NM NO MEASUREMENT

TABLE 3

AIRBORNE PARTICULATES
GROSS BETA CONCENTRATION
AUGUST 1982

LOCATION	# SAM	AIRBORNE PARTICULATES 5-HR FIELD ESTIMATE MAX	MIN	AVG	EERF LAB MEASUREMENT MAX	MIN	AVG
		(pCi/m^3)			(pCi/m^3)		
AL:MONTGOMERY	9	0.9	0.2	0.5	0.02	0.01	0.01
CA:BERKELEY	9	0.2	0.0	0.1	0.01	0.00	0.01
CA:LOS ANGELES	9	0.9	0.0	0.4	0.03	0.01	0.01
CT:HARTFORD	9	0.5	0.2	0.3	0.02	0.01	0.01
DE:WILMINGTON	7	3.1	0.1	0.6	0.01	0.01	0.01
FL:JACKSONVILLE	7	0.2	0.1	0.1	0.02	0.00	0.01
FL:MIAMI	9	0.1	0.0	0.0	0.02	0.00	0.01
HI:HONOLULU	8	0.3	0.0	0.1	0.01	0.00	0.00
IA:IOWA CITY	9	1.5	0.1	0.7	0.04	0.01	0.02
ID:BOISE	9	0.4	0.2	0.4	0.02	0.01	0.01
ID:IDAHO FALLS	9	NM	NM	NM	0.02	0.01	0.01
IL:CHICAGO	9	0.9	0.1	0.4	0.03	0.01	0.02
ME:AUGUSTA	9	0.3	0.1	0.2	0.01	0.01	0.01
MI:LANSING	6	2.6	0.3	0.9	0.06	0.01	0.04
MN:MINNEAPOLIS	9	0.7	0.0	0.3	0.06	0.01	0.03
MO:JEFFERSON CITY	9	1.0	0.1	0.4	0.02	0.01	0.02
MS:JACKSON	9	0.7	0.1	0.4	0.04	0.01	0.02
NC:CHARLOTTE	7	0.4	0.1	0.2	0.02	0.01	0.01
ND:BISMARCK	9	1.1	0.2	0.6	0.02	0.01	0.02
NH:CONCORD	9	2.1	0.8	1.6	0.01	0.00	0.01
NJ:TRENTON	8	4.4	0.3	2.5	0.01	0.00	0.01
NM:SANTA FE	6	0.7	0.4	0.6	0.02	0.01	0.01
NV:LAS VEGAS	9	1.0	0.3	0.7	0.05	0.01	0.02
NY:ALBANY	9	0.4	0.1	0.2	0.02	0.01	0.01
NY:NEW YORK CITY	9	0.3	0.1	0.2	0.02	0.01	0.01
NY:NIAGARA FALLS	9	0.4	0.1	0.2	0.01	0.01	0.01
NY:SYRACUSE	9	0.6	0.1	0.4	0.02	0.01	0.01
OH:COLUMBUS	8	0.9	0.2	0.5	0.03	0.01	0.02
OH:PAINESVILLE	8	0.6	0.1	0.5	0.04	0.01	0.02
OH:TOLEDO	9	0.8	0.3	0.6	0.05	0.01	0.02
OR:PORTLAND	9	NM	NM	NM	0.01	0.00	0.01
PA:HARRISBURG	13	1.9	0.3	0.8	0.02	0.01	0.01
PA:PITTSBURGH	9	1.0	0.4	0.6	0.02	0.01	0.02
RI:PROVIDENCE	9	0.4	0.0	0.2	0.02	0.01	0.01
SC:BARNWELL	1	0.6	0.0	0.0	0.01	0.01	0.01
SC:COLUMBIA	9	0.7	0.1	0.5	0.05	0.01	0.02
SD:PIERRE	9	1.9	0.3	0.8	0.03	0.01	0.02
TX:AUSTIN	9	1.9	0.9	1.3	0.04	0.01	0.02
TX:EL PASO	9	0.9	0.3	0.6	0.06	0.01	0.02
VA:LYNCHBURG	8	0.7	0.1	0.4	0.02	0.01	0.01
WA:SEATTLE	9	0.1	0.0	0.0	0.01	0.00	0.00
WA:SPOKANE	9	0.6	0.2	0.4	0.02	0.01	0.01
WI:MADISON	8	1.6	0.1	0.5	0.03	0.00	0.01

MINIMUM DETECTABLE LIMIT FOR FIELD ESTIMATES - .1 pCi/m^3
MINIMUM DETECTABLE LIMIT FOR LAB MEASUREMENT - .01 pCi/m^3

NM NO MEASUREMENT

TABLE 4

AIRBORNE PARTICULATES
GROSS BETA CONCENTRATION
SEPTEMBER 1982

LOCATION	# SAM	AIRBORNE PARTICULATES 5-HR FIELD ESTIMATE MAX	MIN	AVG	EERF LAB MEASUREMENT MAX	MIN	AVG
		(pCi/m^3)			(pCi/m^3)		
AL:MONTGOMERY	8	1.6	0.2	0.8	0.01	0.01	0.01
CA:BERKELEY	8	0.2	0.1	0.1	0.02	0.01	0.01
CA:LOS ANGELES	7	1.3	0.1	0.6	0.02	0.01	0.01
CT:HARTFORD	9	0.6	0.1	0.3	0.02	0.00	0.01
DE:WILMINGTON	8	0.7	0.0	0.2	0.02	0.01	0.01
FL:JACKSONVILLE	4	0.3	0.0	0.2	0.02	0.01	0.01
FL:MIAMI	8	0.1	0.0	0.0	0.02	0.00	0.00
HI:HONOLULU	8	0.1	0.0	0.1	0.09	0.00	0.02
IA:IOWA CITY	9	1.0	0.1	0.4	0.02	0.00	0.01
ID:BOISE	9	0.7	0.1	0.4	0.01	0.01	0.01
ID:IDAHO FALLS	9	NM	NM	NM	0.02	0.00	0.01
IL:CHICAGO	7	0.8	0.2	0.4	0.04	0.01	0.02
ME:AUGUSTA	9	0.4	0.1	0.2	0.02	0.00	0.01
MN:MINNEAPOLIS	7	0.5	0.1	0.2	0.02	0.01	0.02
MO:JEFFERSON CITY	8	0.4	0.1	0.2	0.02	0.00	0.01
MS:JACKSON	9	0.9	0.1	0.5	0.06	0.01	0.02
NC:CHARLOTTE	1	1.0	0.1	0.1	0.01	0.01	0.01
ND:BISMARCK	7	1.2	0.3	0.7	0.03	0.01	0.02
NH:CONCORD	8	8.6	0.6	2.6	0.02	0.01	0.01
NJ:TRENTON	9	0.6	0.1	0.2	0.02	0.00	0.01
NM:SANTA FE	2	0.4	0.2	0.3	0.06	0.05	0.05
NV:LAS VEGAS	9	1.5	0.2	0.8	0.01	0.00	0.01
NY:ALBANY	8	0.6	0.1	0.3	0.03	0.01	0.01
NY:NEW YORK CITY	8	0.3	0.1	0.2	0.02	0.00	0.01
NY:NIAGARA FALLS	8	0.4	0.1	0.2	0.02	0.00	0.01
NY:SYRACUSE	9	0.4	0.2	0.2	0.03	0.01	0.02
OH:COLUMBUS	9	0.8	0.2	0.4	0.03	0.01	0.01
OH:PAINESVILLE	7	0.9	0.1	0.3	0.04	0.00	0.01
OH:TOLEDO	9	1.2	0.2	0.6	0.04	0.00	0.01
OR:PORTLAND	8	NM	NM	NM	0.01	0.00	0.01
PA:HARRISBURG	12	2.3	0.3	1.0	0.05	0.01	0.02
PA:PITTSBURGH	8	1.2	0.2	0.7	0.03	0.01	0.01
RI:PROVIDENCE	6	0.3	0.2	0.2	0.02	0.00	0.01
SC:BARNWELL	2	NM	NM	NM	0.01	0.01	0.01
SC:COLUMBIA	8	1.2	0.2	0.6	0.04	0.01	0.03
SD:PIERRE	9	1.3	0.3	0.7	0.04	0.01	0.02
TX:AUSTIN	9	3.1	0.8	1.6	0.04	0.01	0.02
TX:EL PASO	5	1.4	0.5	0.9	0.02	0.01	0.01
VA:LYNCHBURG	8	2.2	0.2	0.7	0.02	0.01	0.01
WA:SEATTLE	8	0.6	0.0	0.2	0.01	0.00	0.01
WA:SPOKANE	9	0.6	0.2	0.4	0.01	0.00	0.01
WI:MADISON	9	0.9	0.1	0.4	0.02	0.00	0.01

MINIMUM DETECTABLE LIMIT FOR FIELD ESTIMATES - .1 pCi/m^3
MINIMUM DETECTABLE LIMIT FOR LAB MEASUREMENT - .01 pCi/m^3

NM NO MEASUREMENT

TABLE 5

GROSS BETA CONCENTRATION IN PRECIPITATION

JULY 1982

LOCATION	DEPTH	ACT. ± 2s		SPECIFIC GAMMA ACT.
	(mm)	(nCi/m^2)		(pCi/l)
AL:MONTGOMERY	65.0	0.10	0.03	NA
CO:DENVER	9.5	0.04	0.01	NA
CT:HARTFORD	30.0	0.04	0.02	NA
FL:JACKSONVILLE	169.8	0.47	0.11	NA
ID:BOISE	36.8	0.07	0.02	NA
ID:IDAHO FALLS	4.5	0.02	0.00	NA
IL:CHICAGO	115.7	0.13	0.06	NA
MI:LANSING	72.6	0.04	0.03	NA
MS:JACKSON	13.0	0.04	0.01	NA
ND:BISMARCK	27.8	0.08	0.02	NA
NJ:TRENTON	72.1	0.16	0.04	NA
NY:NEW YORK CITY	28.5	0.05	0.02	NA
NY:NIAGARA FALLS	28.4	0.06	0.02	NA
OH:COLUMBUS	39.4	0.04	0.02	NA
OH:PAINESVILLE	31.9	0.12	0.02	NA
OR:PORTLAND	22.2	0.15	0.02	NA
PA:HARRISBURG	45.0	0.08	0.02	NA
PA:PITTSBURGH	40.0	0.08	0.02	NA
SC:BARNWELL	150.0	0.38	0.09	NA
SC:COLUMBIA	106.3	0.30	0.07	NA
VA:LYNCHBURG	98.4	0.36	0.06	NA
WV:CHARLESTON	18.7	0.03	0.01	NA

NA GAMMA ACTIVITY RESULTS NOT AVAILABLE
s SIGMA COUNTING ERROR

TABLE 6

GROSS BETA CONCENTRATION IN PRECIPITATION

AUGUST 1982

LOCATION	DEPTH	ACT. ± 2s		SPECIFIC GAMMA ACT.
	(mm)	(nCi/m^2)		(pCi/l)
AL:MONTGOMERY	33.8	0.02	0.02	NA
CO:DENVER	36.0	0.08	0.02	NA
CT:HARTFORD	22.3	0.06	0.01	NA
FL:JACKSONVILLE	137.3	0.23	0.07	NA
ID:BOISE	2.0	0.02	0.00	NA
ID:IDAHO FALLS	13.5	0.04	0.01	NA
IL:CHICAGO	64.6	0.11	0.04	NA
MI:LANSING	43.9	0.05	0.02	NA
MS:JACKSON	1.3	0.01	0.00	NA
ND:BISMARCK	28.4	0.14	0.02	NA
NJ:TRENTON	31.5	0.09	0.02	NA
NY:NEW YORK CITY	26.5	0.02	0.01	NA
NY:NIAGARA FALLS	77.5	0.19	0.05	NA
OH:COLUMBUS	6.2	0.03	0.00	NA
OH:PAINESVILLE	55.0	0.21	0.04	NA
OR:PORTLAND	25.0	0.12	0.02	NA
PA:HARRISBURG	77.5	0.13	0.04	NA
PA:PITTSBURGH	6.5	0.04	0.01	NA
SC:BARNWELL	57.5	0.24	0.04	NA
SC:COLUMBIA	132.5	0.28	0.08	NA
TX:AUSTIN	2.6	0.01	0.00	NA
VA:LYNCHBURG	98.4	0.40	0.07	NA

NA GAMMA ACTIVITY RESULTS NOT AVAILABLE
s SIGMA COUNTING ERROR

TABLE 7

GROSS BETA CONCENTRATION IN PRECIPITATION

SEPTEMBER 1982

LOCATION	DEPTH	ACT.	+ 2s	SPECIFIC GAMMA ACT.
	(mm)	(nCi/m^2)		(pCi/l)
AL:MONTGOMERY	13.0	0.05	0.01	NA
CA:BERKELEY	2.6	0.00	0.00	NA
CA:LOS ANGELES	6.1	0.02	0.00	NA
CO:DENVER	10.5	0.01	0.01	NA
CT:HARTFORD	29.9	0.16	0.02	NA
FL:JACKSONVILLE	50.0	0.03	0.02	NA
ID:BOISE	44.5	0.14	0.03	NA
ID:IDAHO FALLS	44.8	0.08	0.02	NA
IL:CHICAGO	9.5	0.03	0.01	NA
MI:LANSING	82.3	0.13	0.05	NA
ND:BISMARCK	15.5	0.07	0.01	NA
NJ:TRENTON	40.3	0.50	0.04	NA
NY:NEW YORK CITY	27.7	0.04	0.01	NA
NY:NIAGARA FALLS	52.5	0.08	0.03	NA
OH:COLUMBUS	25.5	0.03	0.01	NA
OH:PAINESVILLE	125.6	0.32	0.07	NA
OR:PORTLAND	94.3	0.21	0.06	NA
PA:HARRISBURG	15.0	0.01	0.01	NA
PA:PITTSBURGH	55.8	0.14	0.04	NA
SC:COLUMBIA	46.3	0.17	0.03	NA
TX:AUSTIN	7.3	0.02	0.00	NA
WV:CHARLESTON	50.0	0.25	0.04	NA

NA GAMMA ACTIVITY RESULTS NOT AVAILABLE
s SIGMA COUNTING ERROR

TABLE 8

PRECIPITATION
TRITIUM CONCENTRATION

JULY - SEPTEMBER 1982

LOCATION	JULY nCi/l ± 2s	AUGUST nCi/l ± 2s	SEPTEMBER nCi/l ± 2s
AL:MONTGOMERY	0.2 0.2	0.4 0.2	0.4 0.2
CA:BERKELEY	NS	NS	0.5 0.2
CA:LOS ANGELES	NS	NS	0.2 0.2
CO:DENVER	0.3 0.2	0.2 0.2	0.2 0.2
CT:HARTFORD	0.3 0.2	0.3 0.2	0.2 0.2
FL:JACKSONVILLE	0.2 0.2	0.2 0.2	0.3 0.2
ID:BOISE	0.3 0.2	0.2 0.2	0.2 0.2
ID:IDAHO FALLS	0.3 0.2	0.3 0.2	0.3 0.2
IL:CHICAGO	0.3 0.2	0.2 0.2	0.5 0.2
MI:LANSING	0.3 0.2	0.4 0.2	0.5 0.2
MS:JACKSON	0.2 0.2	0.2 0.2	NS
ND:BISMARCK	0.3 0.2	0.3 0.2	0.2 0.2
NJ:TRENTON	0.3 0.2	0.3 0.2	0.2 0.2
NY:NEW YORK CITY	0.2 0.2	0.3 0.2	0.2 0.2
NY:NIAGARA FALLS	0.3 0.2	0.2 0.2	0.2 0.2
OH:COLUMBUS	0.4 0.2	0.3 0.2	0.2 0.2
OH:PAINESVILLE	0.3 0.2	0.3 0.2	0.3 0.2
OR:PORTLAND	0.2 0.2	0.2 0.2	0.1 0.2
PA:HARRISBURG	0.3 0.2	0.2 0.2	0.3 0.2
PA:PITTSBURGH	0.3 0.2	0.3 0.2	0.3 0.2
SC:BARNWELL	1.0 0.2	1.1 0.2	NS
SC:COLUMBIA	1.2 0.2	0.6 0.2	0.5 0.2
TX:AUSTIN	NS	0.2 0.2	0.2 0.2
VA:LYNCHBURG	0.2 0.2	0.2 0.2	NS
WV:CHARLESTON	0.3 0.2	NS	0.4 0.2

NS NO SAMPLE
s SIGMA COUNTING ERROR

Plutonium and Uranium in Airborne Particulates

Environmental radiation levels of plutonium and uranium are determined by the analyses of quarterly composite samples (air filters) collected from the continuously operating airborne particulate samplers. The number of continuously operating stations is being increased from the original 22 will eventually number 67 when all equipment is operational.

Analyses of the composited filters consist of ashing, separating by liquid ion exchange, and coprecipitation of the plutonium or uranium.

Concentration of the specific isotopes of plutonium-238, -239, and uranium-234, -235, and -238 are determined by alpha spectroscopy. The volume of air analyzed normally ranges from 25,000 to 40,000 m^3 for each quarterly composite.

Plutonium and uranium in airborne particulates data for April - June 1982 are shown for the 42 stations operating during this period in Table 9.

TABLE 9

PLUTONIUM AND URANIUM IN AIRBORNE PARTICULATES
APRIL - JUNE 1982 COMPOSITES

LOCATION	^{238}Pu aCi/m^3 ± 2s	^{239}Pu aCi/m^3 ± 2s	^{234}U aCi/m^3 ± 2s	^{235}U aCi/m^3 ± 2s	^{238}U aCi/m^3 ± 2s
AL:MONTGOMERY	0.2 0.4	4.3 1.1	13.2 2.4	0.2 0.2	15.4 2.7
CA:BERKELEY	0.9 0.8	1.7 0.9	8.6 2.3	0.7 0.6	7.4 2.0
CA:LOS ANGELES	0.4 0.5	4.7 1.1	30.1 5.3	1.3 0.6	26.7 4.8
CT:HARTFORD	0.2 0.4	3.1 0.9	20.7 3.6	1.0 0.5	22.8 3.9
DE:DOVER	0.5 0.4	2.2 0.9	13.2 2.6	0.1 0.2	11.6 2.4
FL:JACKSONVILLE	0.4 0.3	5.2 1.3	22.4 3.9	1.0 0.5	20.5 3.6
FL:MIAMI	0.5 0.5	3.6 1.2	19.7 3.8	0.2 0.3	15.9 3.2
HI:HONOLULU	0.4 0.7	3.2 1.0	6.0 1.7	0.6 0.5	5.2 1.5
IA:IOWA CITY	0.3 0.3	5.7 1.3	21.7 4.3	0.6 0.5	20.9 4.2
ID:BOISE	1.5 0.8	5.2 1.2	17.8 3.1	0.8 0.4	17.8 3.1
ID:IDAHO FALLS	1.9 1.3	7.9 2.7	53.9 10.5	2.7 1.5	53.6 10.4
IL:CHICAGO	1.6 1.5	5.4 2.1	40.7 20.4	1.2 2.6	64.2 28.9
KS:TOPEKA	0.2 0.2	3.0 0.8	9.9 1.9	0.2 0.3	11.6 2.2
ME:AUGUSTA	2.3 0.9	6.8 1.6	19.7 3.4	0.6 0.4	22.5 3.8
MI:LANSING	1.5 1.6	8.6 2.5	52.3 10.1	3.8 1.8	45.2 9.0
MN:MINNEAPOLIS	0.4 0.5	4.4 1.1	19.9 3.7	1.2 0.7	23.7 4.3
MO:JEFFERSON CITY	0.6 0.4	4.7 1.1	15.6 2.7	0.5 0.3	15.9 2.7
MS:JACKSON	0.3 0.4	4.2 1.2	26.3 5.1	1.7 0.9	21.4 4.4
ND:BISMARCK	1.3 0.9	3.5 1.4	48.5 10.1	2.2 1.4	51.3 10.5
NH:CONCORD	0.2 0.4	5.0 1.7	10.5 2.3	0.1 0.2	12.3 2.5
NJ:TRENTON	0.6 0.8	2.4 1.3	13.5 3.6	1.0 0.8	13.6 3.7
NV:LAS VEGAS	1.6 1.1	6.9 1.9	89.5 12.9	2.6 1.2	50.9 8.0
NY:ALBANY	-1.0 0.9	3.4 1.6	47.9 11.1	1.2 1.2	48.2 11.2
NY:NEW YORK CITY	-0.1 0.8	3.2 1.3	30.4 6.2	2.0 1.0	21.3 4.7
NY:NIACARA FALLS	0.1 0.7	4.2 1.4	52.4 8.8	1.7 0.8	56.2 9.3
NY:SYRACUSE	0.8 0.7	6.0 1.9	45.7 7.6	1.3 0.8	47.6 7.8
OH:COLUMBUS	0.7 0.5	5.7 1.5	40.8 6.4	1.7 0.7	38.9 6.1
OH:PAINESVILLE	0.6 0.4	4.2 1.0	37.5 5.5	1.0 0.5	36.2 5.3
OH:TOLEDO	0.2 0.3	3.5 0.9	39.7 6.3	1.1 0.5	41.4 6.5
OK:OKLAHOMA CITY	1.2 1.1	3.1 1.4	20.1 5.5	-0.1 0.6	23.5 5.9
OR:PORTLAND	0.4 0.5	2.3 0.9	11.8 2.2	0.7 0.4	9.8 1.9
PA:HARRISBURG	0.6 0.7	3.6 1.3	23.7 4.8	0.6 0.5	18.8 4.0
PA:PITTSBURGH	1.8 1.5	6.1 2.3	56.9 10.1	1.6 1.0	58.2 10.3
RI:PROVIDENCE	0.5 0.5	4.4 1.2	16.1 2.9	1.0 0.5	15.4 2.8
SC:BARNWELL	0.9 0.7	3.5 1.3	17.8 3.7	0.8 0.6	16.4 3.5
SC:COLUMBIA	0.7 0.7	3.3 1.1	26.7 4.7	0.4 0.3	27.0 4.8
SD:PIERRE	0.4 0.4	3.6 1.1	27.5 5.4	0.8 0.6	26.9 5.3
TX:AUSTIN	-0.1 0.3	2.9 0.8	19.4 3.6	1.1 0.7	18.1 3.4
TX:EL PASO	0.8 1.0	5.9 1.8	93.8 15.5	3.3 1.5	81.2 13.6
VA:LYNCHBURG	0.4 0.5	4.4 1.4	74.1 10.6	1.7 0.7	10.3 2.0
WA:SEATTLE	0.3 0.4	3.2 1.0	10.6 2.1	0.3 0.3	10.8 2.2
WA:SPOKANE	0.5 0.6	5.3 1.2	23.6 3.9	1.2 0.5	26.2 4.2
WI:MADISON	-0.1 0.5	4.5 1.2	21.7 3.9	0.6 0.5	20.9 3.7
WV:CHARLESTON	0.3 0.7	4.4 1.4	46.2 8.2	2.9 1.2	43.1 7.8

s SIGMA COUNTING ERROR

Krypton-85

Krypton-85 is a long-lived noble gas with a half life of 10.8 years. It is released into the atmosphere by nuclear reactor operations, fuel fabrication, fuel reprocessing, and nuclear detonations. Krypton-85 also occurs naturally in minor quantities primarily from the neutron capture of stable krypton-84 as well as spontaneous fission and neutron-induced fission of uranium. Monitoring of krypton-85 in the atmosphere has been conducted to identify and establish baseline levels and long-term trends.

Krypton-85 analysis began in January 1973 with sample collections and analyses being performed for 12 sampling locations. These locations were selected to provide atmospheric coverage of the United States with considerations being given to the proximity to fuel reprocessing plants, nuclear reactors, and wide geographic coverage.

Dry compressed air samples, collected at each location, are purchased from commercial air suppliers semiannually and shipped to the EERF where the krypton-85 is cryogenically separated and counted in a liquid scintillation system.

The Kr-85 results will be published when they are available

ERAMS

SECTION II. Water Program

The ERAMS water program provides ambient radiation data to assess the effects of the nuclear power industry, the natural radiation environment, and other nuclear sources on the nation's rivers, streams and drinking water supplies.

Surface Water

Grab samples are taken quarterly at 58 stations located downstream from operating or future nuclear facilities.

Surface water monitoring consists of tritium analyses quarterly and gamma scans annually. Tritium is the primary radioactive pollutant from nuclear power plants.

Tritium concentrations are determined by liquid scintillation counting of distilled samples. Gamma scans are performed annually to determine if there is a buildup of other contaminants.

Tritium concentrations for surface water samples for July - September 1982 are given in Table 10.

TABLE 10

SURFACE WATER
TRITIUM CONCENTRATION

JULY - SEPTEMBER 1982

LOCATION	SOURCE	DATE COLLECTED	nCi/l	± 2s
AL:DECATUR	TENNESSEE RIVER	7/ 6/82	0.5	0.2
AL:DOTHAN	CHATTAHOOCHEE R.	7/ 8/82	0.3	0.2
AL:SCOTTSBORO	TENNESSEE RIVER	7/ 7/82	0.5	0.2
CA:CLAY STATION	FOLSOM S. CANAL	7/15/82	0.2	0.2
CA:DIABLO CANYON	PACIFIC OCEAN	7/16/82	0.1	0.2
CA:EUREKA	HUMBOLDT BAY	7/ 8/82	0.2	0.2
CA:SAN ONOFRE	PACIFIC OCEAN	7/27/82	0.2	0.2
CO:GREELEY	SOUTH PLATTE RIVER	7/ 9/82	1.3	0.2
CT:EAST HADDAM	CONNECTICUT RIVER	7/22/82	0.2	0.2
CT:WATERFORD	LONG ISLAND SOUND	9/15/82	0.2	0.2
FL:CRYSTAL RIVER	GULF OF MEXICO	7/13/82	0.2	0.2
FL:FT. PIERCE	ATLANTIC OCEAN	7/13/82	0.2	0.2
FL:HOMESTEAD	BISCAYNE BAY	7/14/82	0.3	0.2
IA:CEDAR RAPIDS	CEDAR RIVER	7/ 6/82	0.2	0.2
ID:BUHL	SNAKE RIVER	7/ 9/82	0.3	0.2
IL:MARSEILLES	ILLINOIS RIVER	8/15/82	0.4	0.2
IL:MOLINE	MISSISSIPPI RIVER	8/15/82	0.5	0.2
IL:MORRIS	ILLINOIS RIVER	9/15/82	0.3	0.2
IL:OREGON	ROCK RIVER	9/30/82	0.4	0.2
IL:OREGON	ROCK RIVER	9/30/82	0.2	0.2
IL:ZION	LAKE MICHIGAN	9/30/82	0.3	0.2
LA:NEW ORLEANS	MISSISSIPPI RIVER	7/ 6/82	0.2	0.2
MA:PLYMOUTH	CAPE CODE BAY	7/ 7/82	0.2	0.2
MD:CONOWINGO	SUSQUEHANNA RIVER	7/13/82	0.2	0.2
MD:LUSBY	CHESAPEAKE BAY	7/20/82	0.2	0.2
ME:WISCASSET	MONTSEWAY BAY	7/ 6/82	0.2	0.2
MI:BRIDGMAN	LAKE MICHIGAN	7/ 6/82	0.3	0.2
MI:CHARLEVOIX	LAKE MICHIGAN	7/10/82	0.2	0.2
MI:MONROE	LAKE ERIE	7/12/82	0.2	0.2
MI:SOUTH HAVEN	LAKE MICHIGAN	7/ 6/82	0.3	0.2
MN:MONTICELLO	MISSISSIPPI RIVER	8/ 5/82	0.2	0.2
MN:RED WING	MISSISSIPPI RIVER	7/13/82	0.3	0.2
MS:PORT GIBSON	MISSISSIPPI RIVER	7/27/82	0.1	0.2
NC:CHARLOTTE	CATAWBA RIVER	7/19/82	0.4	0.2
NE:RULO	MISSOURI RIVER	7/ 8/82	0.2	0.2
NJ:BAYSIDE	DELAWARE RIVER	7/13/82	0.2	0.2
NJ:OYSTER CREEK	OYSTER CREEK	7/ 8/82	0.2	0.2
NV:BOULDER CITY	COLORADO RIVER	7/ 7/82	0.4	0.2
NY:OSSINING	HUDSON RIVER	9/ 1/82	0.5	0.2
NY:OSWEGO	LAKE ONTARIO	8/15/82	0.3	0.2
NY:POUGHKEEPSIE	HUDSON RIVER	7/ 7/82	0.2	0.2
OH:TOLEDO	LAKE ERIE	7/ 6/82	0.1	0.2

TABLE 10 (CONTINUED)

SURFACE WATER
TRITIUM CONCENTRATION

JULY - SEPTEMBER 1982

LOCATION	SOURCE	DATE COLLECTED	nCi/l	± 2s
OR:BRADWOOD	COLUMBIA RIVER	8/14/82	0.4	0.2
PA:DANVILLE	SUSQUEHANNA RIVER	7/14/82	0.2	0.2
SC:ALLENDALE	SAVANNAH RIVER	7/15/82	3.9	0.2
SC:BROAD RIVER	BROAD RIVER	7/ 2/82	0.2	0.2
SC:HARTSVILLE	LAKE ROBINSON	7/19/82	0.5	0.2
TN:DAISY	TENNESSEE RIVER	8/ 3/82	0.2	0.2
TN:KINGSTON	CLINCH RIVER	9/20/82	0.5	0.2
TX:EL PASO	RIO GRANDE	7/28/82	0.2	0.2
TX:MATAGORDA	COLORADO RIVER	9/24/82	0.2	0.2
VA:DOSWELL	NORTH ANNA RIVER	7/ 9/82	2.4	0.2
VA:NEWPORT NEWS	JAMES RIVER	8/14/82	0.3	0.2
VT:VERNON	CONNECTICUT RIVER	9/29/82	0.3	0.2
WA:NORTHPORT	COLUMBIA RIVER	7/15/82	0.3	0.2
WA:RICHLAND	COLUMBIA RIVER	7/ 7/82	0.2	0.2
WI:VICTORY	MISSISSIPPI RIVER	7/15/82	0.2	0.2
WV:WHEELING	OHIO RIVER	8/24/82	0.4	0.2

s SIGMA COUNTING ERROR

Drinking Water

The drinking water program provides ambient radiation monitoring relevant to the effects of the nuclear power industry, natural environmental levels, and other pertinent sources. These data serve to assess trends and anomalies in concentrations, and to compare with standards set forth in the EPA "National Interim Primary Drinking Water Regulations." These regulations provide for approval of supplies when the combined radium-226 and radium-228 levels do not exceed 5 pCi/l, when the gross alpha (excluding radon and uranium) levels do not exceed 15 pCi/l, when tritium levels do not exceed 20,000 pCi/l, when the strontium-90 levels do not exceed 8 pCi/l, and when the gross beta levels do not exceed 50 pCi/l.

Grab samples are taken at 78 sites which are either major population centers or selected nuclear facility environs.

The analyses include (a) tritium on a quarterly basis (b) gross alpha, gross beta, and strontium-90 on annual composites (gamma analyses are performed if the gross beta activity is greater than 10 pCi/l; radium-226 analyses are performed if the gross alpha exceeds 2 pCi/l; and radium-228 analyses are performed if the radium-226 activity falls between 3 and 5 pCi/l) (c) specific iodine-131 is performed on one quarterly sample per year for each station (d) an annual composite for plutonium-238, -239, uranium-234, -235, -238, on 22 selected sampling locations corresponding to continuously operating air particulate stations.

Tritium analyses are performed by scintillation counting of the distilled samples, gross beta, and gross alpha by evaporating an aliquot on stainless steel planchets for counting, and radium-226 by the standard emanation technique. Strontium-90 is determined by beta counting a strontium carbonate precipitate isolated by ion exchange.

The results of tritium in drinking water analyses for July - September 1982 are shown in Table 11.

Iodine-131 concentration in drinking water for 1982 is shown in Table 12.

All samples were taken as either a single grab sample or composite samples taken over 12 to 14 days.

Radon-222 in Drinking Water

Radon-222 in drinking water has previously been considered a source of radiation exposure primarily from an ingestion standpoint. The Office of Radiation Programs (ORP) of the U.S. Environmental Protection Agency (EPA) is investigating radon in water supplies to evaluate the possibility that a major pathway from inhalation exposure may exist in addition to the ingestion pathway. As an inert

gas, radon is not chemically bound to the water and consequently can be released during any operation that aerates or agitates water. Depending upon the initial concentration of radon in water, significant quantities of radon could be released in a home or to the general environment.

To determine the scope of this potential problem, a national ground water sampling program has been initiated by the Eastern Environmental Radiation Facility (EERF) to obtain data on radon concentrations in water supplies throughout the country. Sampling kits have been assembled by EERF and distributed to various state health departments. The kit is designed so that state personnel can collect samples from potable water supplies and ship them, without loss of radon other than radioactive decay, to EERF for analysis.

The selection of water supplies to be sampled is handled by two separate methods. Method 1 in which each state collects samples from all groundwater supplies serving at least 1000 people and Method 2 in which the choice of sampling locations and the number of supplies to be sampled is left to the discretion of the state programs. Each state is asked to obtain a representative sampling of ground water supplies within its boundaries. The extent of the sampling efforts and how representative the data are for a given state is determined primarily by the amount of time each state devotes to the program.

The concentrations of radon in water are determined at the EERF by liquid scintillation counting. The limit of detection for this technique using a 50-minute count and a 10-ml sample is 0.16 pCi or 16 pci/l.

The sampling kits are being provided to the various states on a rotating schedule. This schedule is designed to cover the U.S. within approximately two years.

Data will be published as it becomes available.

TABLE 11

DRINKING WATER
TRITIUM CONCENTRATION

JULY - SEPTEMBER 1982

LOCATION	DATE COLLECTED	nCi/l	± 2s
AK:FAIRBANKS	7/19/82	0.3	0.2
AL:DOTHAN	7/ 8/82	0.2	0.2
AL:MONTGOMERY	7/ 9/82	0.3	0.2
AL:MUSCLE SHOALS	7/ 6/82	0.4	0.2
AL:SCOTTSBORO	7/ 7/82	0.5	0.2
CA:BERKELEY	7/13/82	0.3	0.2
CA:LOS ANGELES	7/ 8/82	0.2	0.2
CO:DENVER	7/12/82	0.2	0.2
CO:PLATTEVILLE	7/ 9/82	0.3	0.2
CT:HARTFORD	7/ 8/82	0.3	0.2
DE:DOVER	7/ 7/82	0.2	0.2
FL:MIAMI	7/ 1/82	0.2	0.2
FL:TAMPA	7/19/82	0.2	0.2
GA:SAVANNAH	7/20/82	1.9	0.2
HI:HONOLULU	7/23/82	0.1	0.2
IA:CEDAR RAPIDS	7/ 6/82	0.4	0.2
ID:BOISE	9/30/82	0.6	0.2
ID:IDAHO FALLS	7/ 8/82	0.3	0.2
IL:MORRIS	7/ 1/82	0.2	0.2
IL:W. CHICAGO	7/ 6/82	0.2	0.2
KS:TOPEKA	7/ 2/82	0.1	0.2
MA:LAWRENCE	7/21/82	0.1	0.2
MD:BALTIMORE	7/ 2/82	0.2	0.2
MD:CONOWINGO	7/13/82	0.2	0.2
ME:AUGUSTA	7/14/82	0.2	0.2
MI:DETROIT	7/ 8/82	0.3	0.2
MI:GRAND RAPIDS	7/ 6/82	0.2	0.2
MN:MINNEAPOLIS	7/ 6/82	0.4	0.2
MN:RED WING	7/13/82	0.1	0.2
MS:JACKSON	7/ 6/82	0.3	0.2
MS:PORT GIBSON	7/14/82	0.2	0.2
MT:HELENA	7/ 7/82	0.3	0.2
NC:CHARLOTTE	7/19/82	0.3	0.2
ND:BISMARCK	7/13/82	0.4	0.2
NE:LINCOLN	7/15/82	0.2	0.2
NH:CONCORD	7/ 6/82	0.2	0.2
NJ:TRENTON	7/ 7/82	0.2	0.2
NJ:WARETOWN	7/ 8/82	0.2	0.2
NM:SANTA FE	7/ 7/82	0.2	0.2
NV:LAS VEGAS	7/ 7/82	0.4	0.2
NY:ALBANY	7/ 8/82	0.2	0.2
NY:NEW YORK CITY	8/ 2/82	0.1	0.2
NY:NIAGARA FALLS	7/ 7/82	0.3	0.2
NY:SYRACUSE	7/16/82	0.2	0.2

TABLE 11 (CONTINUED)

DRINKING WATER
TRITIUM CONCENTRATION

JULY - SEPTEMBER 1982

LOCATION	DATE COLLECTED	nCi/l	± 2s
OH:CINCINNATI	8/15/82	0.4	0.2
OH:COLUMBUS	8/10/82	0.2	0.2
OH:EAST LIVERPOOL	8/11/82	0.2	0.2
OH:PAINESVILLE	7/ 7/82	0.5	0.2
OH:TOLEDO	7/ 6/82	0.4	0.2
OK:OKLAHOMA CITY	7/ 2/82	0.1	0.2
OR:PORTLAND	7/12/82	0.2	0.2
PA:COLUMBIA	7/ 8/82	0.2	0.2
PA:HARRISBURG	7/14/82	0.4	0.2
PA:PITTSBURGH	8/11/82	0.3	0.2
PC:ANCON	8/ 2/82	0.2	0.2
RI:PROVIDENCE	7/ 9/82	0.1	0.2
SC:BARNWELL	7/15/82	0.2	0.2
SC:COLUMBIA	7/ 2/82	0.3	0.2
SC:HARTSVILLE	7/15/82	0.1	0.2
SC:JENKINSVILLE	7/ 9/82	0.3	0.2
SC:SENECA	7/13/82	0.2	0.2
TN:CHATTANOOGA	9/30/82	0.4	0.2
TN:KNOXVILLE	7/ 2/82	0.1	0.2
TX:AUSTIN	7/ 7/82	0.3	0.2
VA:DOSWELL	7/20/82	0.3	0.2
VA:LYNCHBURG	7/ 7/82	0.2	0.2
VA:VIRGINIA BEACH	7/ 6/82	0.3	0.2
VI:ST. THOMAS	7/26/82	0.3	0.2
WA:RICHLAND	7/ 8/82	0.2	0.2
WA:SEATTLE	7/ 8/82	0.3	0.2
WA:SEATTLE	7/ 7/82	0.2	0.2
WI:GENOA CITY	7/15/82	0.2	0.2
WI:MADISON	7/14/82	0.2	0.2

s SIGMA COUNTING ERROR

TABLE 12

IODINE-131 IN DRINKING WATER

1982

LOCATION	DATE COLLECTED	nCi/l	+	2s
AK:FAIRBANKS	7/19/82	0.0		0.1
AL:DOTHAN	7/ 8/82	-0.1		0.1
AL:MONTGOMERY	4/ 5/82	0.0		0.0
AL:MUSCLE SHOALS	10/ 5/82	0.1		0.2
AL:SCOTTSBORO	7/ 7/82	-0.3		0.1
AR:LITTLE ROCK	2/24/82	0.1		0.1
CA:BERKELEY	4/ 7/82	-0.1		0.1
CA:LOS ANGELES	7/ 8/82	-0.2		0.1
CO:DENVER	7/12/82	0.2		0.1
CO:PLATTEVILLE	10/29/82	0.3		0.2
CT:HARTFORD	4/12/82	0.0		0.1
DE:DOVER	7/ 7/82	-0.2		0.1
FL:MIAMI	1/ 4/82	-0.2		0.1
FL:TAMPA	7/19/82	0.0		0.1
GA:SAVANNAH	4/12/82	0.1		0.1
HI:HONOLULU	2/ 5/82	0.1		0.1
IA:CEDAR RAPIDS	4/20/82	-0.2		0.1
ID:BOISE	4/ 1/82	0.0		0.1
ID:IDAHO FALLS	4/ 8/82	0.1		0.1
IL:MORRIS	10/ 4/82	0.0		0.2
IL:W. CHICAGO	4/ 1/82	0.0		0.1
KS:TOPEKA	1/ 4/82	0.0		0.0
LA:NEW ORLEANS	4/14/82	0.0		0.1
MA:LAWRENCE	1/19/82	0.0		0.1
MA:ROWE	3/31/82	0.1		0.1
MD:BALTIMORE	4/13/82	0.0		0.1
MD:CONOWINGO	1/12/82	-0.4		0.1
ME:AUGUSTA	4/ 5/82	0.0		0.1
MI:DETROIT	1/13/82	0.0		0.1
MI:GRAND RAPIDS	1/13/82	0.0		0.1
MN:MINNEAPOLIS	4/ 8/82	0.0		0.2
MN:RED WING	4/ 9/82	0.1		0.1
MO:JEFFERSON CITY	4/19/82	0.0		0.1
MS:JACKSON	4/15/82	-0.5		0.2
MS:PORT GIBSON	1/25/82	0.0		0.1
MT:HELENA	7/ 7/82	-0.3		0.1
NC:CHARLOTTE	1/20/82	0.1		0.1
ND:BISMARCK	1/11/82	0.0		0.1
NE:LINCOLN	1/11/82	0.0		0.1
NH:CONCORD	7/ 6/82	0.0		0.1
NJ:TRENTON	7/ 7/82	0.0		0.1
NJ:WARETOWN	1/21/82	0.1		0.1
NM:SANTA FE	4/ 5/82	0.0		0.1
NV:LAS VEGAS	4/ 2/82	-0.1		0.1

TABLE 12 (CONTINUED)

IODINE-131 IN DRINKING WATER

1982

LOCATION	DATE COLLECTED	nCi/l ±	2s
NY:ALBANY	7/ 8/82	0.0	0.1
NY:NEW YORK CITY	8/ 2/82	0.1	0.1
NY:NIAGARA FALLS	4/ 5/82	-0.1	0.1
NY:SYRACUSE	10/21/82	0.2	0.2
OH:COLUMBUS	6/ 1/82	0.0	0.1
OH:EAST LIVERPOOL	4/14/82	0.0	0.1
OH:PAINESVILLE	1/14/82	-0.1	0.1
OH:TOLEDO	7/ 6/82	0.1	0.1
OK:OKLAHOMA CITY	10/12/82	0.1	0.1
OR:PORTLAND	1/11/82	0.1	0.1
PA:COLUMBIA	4/15/82	0.0	0.0
PA:HARRISBURG	1/14/82	-0.1	0.1
PA:PITTSBURGH	4/14/82	-0.2	0.1
PC:ANCON	6/ 1/82	0.1	0.1
RI:PROVIDENCE	1/ 4/82	0.1	0.1
SC:BARNWELL	1/27/82	0.0	0.1
SC:COLUMBIA	4/13/82	0.0	0.1
SC:HARTSVILLE	1/ 4/82	0.0	0.1
SC:JENKINSVILLE	1/22/82	0.1	0.1
SC:SENECA	4/13/82	-0.1	0.1
TN:CHATTANOOGA	9/30/82	0.1	0.1
TN:KNOXVILLE	1/ 4/82	0.0	0.2
TX:AUSTIN	7/ 7/82	-0.2	0.1
VA:DOSWELL	2/ 1/82	0.1	0.1
VA:LYNCHBURG	7/ 7/82	0.0	0.0
VA:VIRGINIA BEACH	4/ 1/82	0.0	0.1
WA:RICHLAND	1/13/82	0.1	0.2
WA:SEATTLE	10/ 4/82	0.1	0.1
WI:GENOA CITY	1/13/82	-0.1	0.1
WI:MADISON	1/15/82	0.2	0.1

NS NO SAMPLE
s SIGMA COUNTING ERROR

SECTION III. External Gamma Ambient Monitoring Program

The external gamma monitoring program, which began in October 1978, provides a continuous measurement of ambient gamma exposure rates, including cosmic, at selected sites throughout the continental United States. Data from this program will be used to evaluate fluctuations in natural background due to variations in environmental conditions and to provide a means of monitoring any significant increases in ambient gamma levels due to weapons fallout, reactor operations, etc. Initially, the program will consist of approximately 22 sites representing a wide geographic coverage throughout the country. Hopefully, at some later date additional sites will be added to the program. Although exposure measurements at these few sites are not totally representative of nationwide exposures, they will be indicative of national trends.

The monitoring program utilizes CaF_2:Mn thermoluminescent dosimeters (TLD's). These dosimeters are commercially available glass-bulb type dosimeters with energy compensating shields. A group of four TLD's is located at each station or site. Dosimeters are annealed by the station operator prior to positioning in the field. The dosimeters are returned to EERF for readout on an approximate one-month cycle. Several dosimeters are annealed by the station operator as controls and returned with the exposed field dosimeters to correct for any exposures accumulated during shipment.

Results from the period July - September 1982 are shown in Table 13.

TABLE 13

ENVIRONMENTAL GAMMA AMBIENT MONITORING PROGRAM

LOCATION	DATE RANGE	INTEGRATED EXPOSURE	EXPOSURE RATE	
		MR	MICRO R/HR ± 2 s *	
AL:MONTGOMERY	70282- 81982	11.5	10.0	5.6
AL:MONTGOMERY	81982- 90182	3.2	10.4	5.6
AL:MONTGOMERY	90182-100482	6.3	7.9	4.4
CA:BERKELEY	70282- 80282	4.1	5.4	22.2
CA:BERKELEY	80282- 83182	3.6	5.2	27.7
CA:BERKELEY	83182-100182	4.4	5.9	6.8
CO:DENVER	63082- 80382	11.4	14.0	6.6
CO:DENVER	80382- 90182	11.4	16.4	10.7
CO:DENVER	90182-100582	11.5	14.1	5.0
FL:ORLANDO	60482- 71382	4.9	5.3	21.2
FL:ORLANDO	71382- 73082	2.1	5.2	9.2
FL:ORLANDO	73082- 83182	4.3	5.5	5.4
FL:ORLANDO	83182- 93082	4.0	5.6	23.9
ID:BOISE	70682- 80582	7.9	11.0	9.2
ID:BOISE	80582- 90782	9.1	11.5	4.5
ID:BOISE	90782-100682	7.8	11.2	3.5
IL:CHICAGO	70682- 80382	5.1	7.6	8.3
IL:CHICAGO	80382- 90382	5.2	7.0	6.9
IL:CHICAGO	90382-100582	5.1	6.7	5.6
ND:BISMARCK	63082- 80682	7.4	8.4	8.1
ND:BISMARCK	80682- 90282	5.3	8.2	5.1
ND:BISMARCK	90182-100782	7.0	8.1	8.6
NJ:TRENTON	70182- 80282	7.7	10.0	6.6
NJ:TRENTON	80282- 90282	6.9	9.3	16.2
NJ:TRENTON	90282-100882	7.9	9.2	5.8
NM:SANTA FE	62282- 73082	16.6	18.2	3.3
NM:SANTA FE	73082- 83182	10.0	13.0	8.5
NM:SANTA FE	83182-100582	10.5	12.5	5.8
NV:LAS VEGAS	70182- 73082	4.6	6.7	7.0
NV:LAS VEGAS	73082- 83182	4.8	6.2	7.9
NV:LAS VEGAS	83182- 93082	4.5	6.3	8.9
NY:NEW YORK	70882- 81082	6.8	8.6	20.4
NY:NEW YORK	81082- 90382	4.8	8.3	11.2
NY:NEW YORK	90382-100682	5.8	7.4	8.4
OH:COLUMBUS	70182- 80282	5.3	6.8	6.8
OH:COLUMBUS	80282- 90182	4.9	6.8	5.6
OH:COLUMBUS	90182-100182	5.1	7.0	20.4
OK:OKLAHOMA CITY	70682-102182	20.7	8.1	6.7
OR:PORTLAND	70782- 80382	4.7	7.2	4.6
OR:PORTLAND	80382- 90382	5.9	7.9	4.5
OR:PORTLAND	90382-100682	5.1	6.5	5.4
PA:HARRISBURG	62982- 80382	5.5	6.5	22.6
PA:HARRISBURG	80382- 83082	4.1	6.3	9.5
PA:HARRISBURG	83082-100482	5.0	5.9	7.4
PA:PITTSBURGH	70282- 80282	9.4	12.7	6.2
PA:PITTSBURGH	80282- 90382	9.1	11.8	4.1
PA:PITTSBURGH	90382-100182	8.2	12.2	4.3

TABLE 13 (CONTINUED)

ENVIRONMENTAL GAMMA AMBIENT MONITORING PROGRAM

LOCATION	DATE RANGE	INTEGRATED EXPOSURE	EXPOSURE RATE	
		MR	MICRO R/HR	+ 2 s *
RI:PROVIDENCE	70982- 80482	8.1	13.0	5.5
RI:PROVIDENCE	80482- 90882	8.6	10.3	8.0
RI:PROVIDENCE	90882-102182	11.7	11.3	4.2
SC:BARNWELL	70182- 73082	5.2	7.4	6.3
SC:BARNWELL	73082- 90982	6.3	6.4	18.8
SC:BARNWELL	90282-102182	9.3	7.9	7.8
SC:COLUMBIA	62982- 73082	6.3	8.5	4.6
SC:COLUMBIA	73082- 83182	6.4	8.3	5.3
SC:COLUMBIA	83182-100182	6.4	8.6	5.8
TN:KNOXVILLE	70182- 72982	6.3	9.4	8.3
TN:KNOXVILLE	72982- 90782	9.1	9.5	3.6
TN:KNOXVILLE	90782-100182	5.5	9.6	8.1
VA:RICHMOND	63082- 80382	5.6	6.9	5.0
VA:RICHMOND	80382- 83182	3.4	5.0	15.3
VA:RICHMOND	83182-100482	6.1	7.5	18.6
VT:MONTPELIER	62882- 80282	6.4	7.6	5.8
VT:MONTPELIER	80282- 90782	6.5	7.5	5.4
VT:MONTPELIER	90782-100482	5.2	8.1	6.5

* e = SIGMA ERROR (IN PERCENT)

SECTION IV. Milk Program

Pasteurized Milk

This is a cooperative program of the EPA, ORP and the Dairy and Lipid Products Branch, Milk Sanitation Section, Food and Drug Administration. Milk is a reliable indicator of the general populations intake of radionuclides since it is consumed by a large segment of the population and contains several of the biologically important contaminants resulting from environmental releases from nuclear activities. A primary function of this program is to obtain reliable monitoring data relative to current radionuclide concentrations and determine any long-term trends.

Monthly samples are collected at 65 sampling sites with one or more located in each state, Puerto Rico, and the Panama Canal. These are composite samples representing more than 80 percent of the milk consumed in a given population center.

These samples are analyzed for iodine-131, barium-140, cesium-137, and potassium. All 65 samples are analyzed annually in July for strontium-89, and strontium-90. Also, for the first month of the three quarters beginning January, April and October, 10 regional composite samples of milk made up from the states within each of EPA's 10 regions are analyzed for strontium-89 and strontium-90.

Iodine-131, barium-140, cesium-137 and potassium are determined by gamma spectral analysis. Strontium-89 and strontium-90 are determined by beta counting a total strontium precipitate which has been chemically separated by ion-exchange.

The values from the pasteurized milk samples for July - September 1982 are shown in Tables 14 - 16. Strontium values from regional composite samples collected July - September 1982 are shown in Table 17.

Tritium in Milk

It was previously proposed to analyze all 65 milk samples for tritium in the aqueous and organic phases, on an annual basis (on the April sample). The EERF is currently evaluating alternative analytical techniques anticipating that these analyses will begin during the coming year.

TABLE 14

CONCENTRATIONS OF RADIONUCLIDES IN PASTEURIZED MILK

JULY 1982

LOCATION	DATE COLLECTED	K g/l+2s	^{137}Cs pCi/l+2s	^{140}Ba pCi/l+2s	^{131}I pCi/l+2s
AK:ANCHORAGE	7/ 1/82	1.60 0.16	-4 10	-7 14	-7 10
AL:MONTGOMERY	7/ 8/82	1.59 0.17	0 11	2 14	6 10
AR:LITTLE ROCK	7/ 6/82	1.38 0.16	6 11	-21 13	-11 9
AZ:PHOENIX	7/ 8/82	1.53 0.24	-2 15	1 20	7 14
CA:LOS ANGELES	7/23/82	1.37 0.22	-4 14	-22 19	-2 13
CA:SACRAMENTO	7/ 1/82	1.36 0.22	-16 14	-21 19	-8 13
CA:SAN FRANCISCO	7/ 8/82	1.22 0.15	-10 10	-37 16	-9 9
CO:DENVER	7/27/82	1.31 0.22	-9 14	-23 19	-6 13
CT:HARTFORD	7/ 6/82	1.32 0.15	2 11	-17 13	-14 9
DC:WASHINGTON	7/ 2/82	1.26 0.21	-6 14	-22 19	-6 13
DE:WILMINGTON	7/ 7/82	1.36 0.22	-2 14	-27 19	-11 13
FL:TAMPA	7/ 6/82	1.40 0.22	1 15	-20 19	-3 13
HI:HONOLULU	7/ 6/82	1.21 0.21	4 15	-24 19	-9 13
IA:DES MOINES	7/12/82	1.32 0.21	-7 14	-43 21	-11 12
ID:IDAHO FALLS	7/ 7/82	1.39 0.22	11 15	-19 19	-10 13
IL:CHICAGO	7/12/82	1.48 0.16	-4 10	-12 14	-7 10
IN:INDIANAPOLIS	7/ 6/82	1.38 0.16	-6 10	-18 13	-4 9
KS:WICHITA	7/ 8/82	1.74 0.24	3 15	3 20	-3 14
KY:LOUISVILLE	7/ 6/82	1.39 0.22	-1 15	-10 19	-10 13
MA:BOSTON	7/13/82	1.26 0.21	2 15	-27 19	-10 13
MD:BALTIMORE	7/ 2/82	1.36 0.22	-7 14	-56 36	-10 13
ME:PORTLAND	7/ 8/82	1.44 0.22	2 15	-37 25	-6 13
MI:DETROIT	7/ 8/82	1.28 0.22	1 15	-15 19	-13 13
MI:GRAND RAPIDS	7/12/82	1.23 0.21	-2 14	-35 22	-9 13
MO:KANSAS CITY	7/ 9/82	1.30 0.22	-10 14	-16 19	-18 12
MO:ST LOUIS	7/ 7/82	1.86 0.25	4 15	-2 20	-4 14
MS:JACKSON	7/ 7/82	1.32 0.22	-3 15	-11 19	-4 13
MT:HELENA	7/ 6/82	1.90 0.25	15 16	13 20	-2 14
NC:CHARLOTTE	7/ 6/82	1.49 0.22	-12 14	-12 19	1 13
ND:MINOT	7/ 6/82	1.71 0.17	2 11	4 14	-3 10
NE:OMAHA	7/ 9/82	1.54 0.17	5 11	10 14	6 10
NH:MANCHESTER	7/ 6/82	1.41 0.22	-2 15	-37 21	-1 13
NJ:TRENTON	7/ 1/82	1.39 0.16	-6 10	-16 13	-6 9
NM:ALBUQUERQUE	7/ 6/82	1.25 0.21	-3 15	-14 19	-8 13
NV:LAS VEGAS	7/ 6/82	1.66 0.24	7 15	-7 20	2 14
NY:BUFFALO	7/12/82	1.59 0.22	1 15	-36 21	-13 13
NY:NEW YORK CITY	7/12/82	1.63 0.17	-4 10	-19 15	-11 9
NY:SYRACUSE	7/ 8/82	1.36 0.22	-3 15	-20 19	-5 13
OH:CINCINNATI	7/12/82	1.65 0.24	12 16	8 20	-10 14
OH:CLEVELAND	7/ 7/82	1.16 0.21	-2 15	-18 19	-9 13
OK:OKLAHOMA CITY	7/ 6/82	1.34 0.22	-9 14	-22 19	-7 13
OR:PORTLAND	7/ 6/82	1.40 0.22	-5 14	-24 19	-2 13
PA:PHILADELPHIA	7/ 6/82	1.33 0.22	10 15	-25 19	-8 13
PA:PITTSBURGH	7/ 7/82	1.77 0.24	6 15	19 20	-1 14

TABLE 14 (CONTINUED)

CONCENTRATIONS OF RADIONUCLIDES IN PASTEURIZED MILK

JULY 1982

LOCATION	DATE COLLECTED	K g/l±2s	^{137}Cs pCi/l±2s	^{140}Ba pCi/l±2s	^{131}I pCi/l±2s
PC:ANCON	7/22/82	1.35 0.22	-2 15	-4 19	-6 13
PR:SAN JUAN	7/22/82	1.35 0.12	1 7	-5 8	-5 7
SC:CHARLESTON	7/22/82	1.38 0.22	-10 14	-25 19	-4 13
SD:RAPID CITY	7/ 8/82	1.40 0.22	-1 15	-22 19	-5 13
TN:CHATTANOOGA	7/ 6/82	1.30 0.22	-13 14	-20 19	-3 13
TN:KNOXVILLE	7/ 6/82	1.81 0.25	0 14	13 20	-2 14
TN:MEMPHIS	7/29/82	1.32 0.22	-4 15	-12 19	-16 13
TX:AUSTIN	7/15/82	1.36 0.22	-4 14	-28 19	-8 13
UT:SALT LAKE CITY	7/ 6/82	1.65 0.22	-11 14	-13 19	-9 13
VA:NORFOLK	7/19/82	1.32 0.22	-6 14	-41 22	-3 13
VT:BURLINGTON	7/12/82	1.22 0.21	-8 14	-46 22	-11 12
WA:SEATTLE	7/ 2/82	1.41 0.22	0 15	-6 19	-6 13
WA:SEATTLE	7/30/82	1.37 0.22	-11 14	-23 19	-8 13
WA:SPOKANE	7/ 6/82	1.38 0.16	-2 10	-30 15	-13 9
WI:MILWAUKEE	7/ 6/82	1.76 0.17	6 11	0 14	11 10
WV:CHARLESTON	7/ 7/82	1.39 0.16	-7 10	-15 13	-9 9
WY:LARAMIE	7/ 7/82	1.62 0.24	9 15	-2 20	-6 14

s SIGMA COUNTING ERROR

TABLE 15

CONCENTRATIONS OF RADIONUCLIDES IN PASTEURIZED MILK

AUGUST 1982

LOCATION	DATE COLLECTED	K g/l+2s	^{137}Cs pCi/l+2s	^{140}Ba pCi/l+2s	^{131}I pCi/l+2s
AK:ANCHORAGE	8/ 3/82	1.74 0.24	-2 15	6 20	0 14
AL:MONTGOMERY	8/ 5/82	1.42 0.24	9 15	-5 20	-5 14
AR:LITTLE ROCK	8/ 9/82	1.62 0.24	18 16	9 20	1 14
AZ:PHOENIX	8/ 4/82	2.01 0.25	6 15	4 20	1 14
CA:LOS ANGELES	8/16/82	1.91 0.25	17 16	-11 20	10 14
CA:SACRAMENTO	8/31/82	1.89 0.25	8 15	3 20	-2 14
CA:SACRAMENTO	8/ 2/82	1.48 0.16	-5 10	-22 13	-1 9
CA:SAN FRANCISCO	8/10/82	1.77 0.24	5 15	-9 20	1 14
CO:DENVER	8/31/82	1.67 0.24	6 15	-1 20	4 14
CT:HARTFORD	8/ 9/82	1.66 0.24	14 16	3 20	-8 14
DC:WASHINGTON	8/ 6/82	1.62 0.24	3 15	2 20	-11 14
DE:WILMINGTON	8/ 5/82	1.66 0.24	-4 15	2 20	-2 14
FL:TAMPA	8/ 3/82	1.29 0.22	8 15	-18 19	5 13
GA:ATLANTA	8/ 2/82	1.84 0.25	9 15	3 20	-7 14
HI:HONOLULU	8/ 3/82	1.43 0.22	1 15	-28 19	2 13
IA:DES MOINES	8/10/82	1.77 0.24	7 15	3 20	3 14
ID:IDAHO FALLS	8/ 4/82	1.84 0.17	4 11	0 14	2 10
IL:CHICAGO	8/ 2/82	1.69 0.24	13 16	3 20	-1 14
IN:INDIANAPOLIS	8/ 2/82	1.27 0.22	-10 14	-1 19	-2 13
KS:WICHITA	8/ 2/82	1.69 0.24	1 15	0 20	-3 14
KY:LOUISVILLE	8/ 3/82	1.40 0.22	-2 15	-21 19	-1 13
LA:NEW ORLEANS	8/ 4/82	1.64 0.24	15 16	0 20	1 14
MA:BOSTON	8/ 3/82	1.49 0.21	14 14	7 19	2 12
MD:BALTIMORE	8/ 6/82	1.82 0.24	11 15	-4 20	-4 14
ME:PORTLAND	8/ 9/82	1.78 0.17	10 11	0 14	2 10
MI:DETROIT	8/ 4/82	1.35 0.21	3 14	12 19	-3 12
MI:GRAND RAPIDS	8/ 3/82	1.36 0.22	0 15	-34 22	-10 13
MN:MINNEAPOLIS	8/ 2/82	1.47 0.21	3 14	8 19	-6 12
MN:ST PAUL	8/ 4/82	1.83 0.24	2 15	-11 20	2 14
MO:KANSAS CITY	8/ 5/82	1.69 0.24	1 15	-3 20	0 14
MO:ST LOUIS	8/ 3/82	1.56 0.24	6 15	-2 20	-1 14
MS:JACKSON	8/ 2/82	1.32 0.16	-2 11	-13 13	-7 9
MT:HELENA	8/ 9/82	1.54 0.24	8 15	5 20	-1 14
NC:CHARLOTTE	8/ 2/82	1.19 0.21	9 15	-21 19	6 13
ND:MINOT	8/17/82	1.72 0.24	-2 15	0 20	-2 14
NE:OMAHA	8/ 6/82	1.39 0.24	11 15	9 20	0 14
NH:MANCHESTER	8/ 2/82	1.48 0.22	7 15	-17 19	4 13
NJ:TRENTON	8/ 5/82	1.69 0.24	0 15	-3 20	3 14
NV:LAS VEGAS	8/10/82	1.66 0.24	9 15	-3 20	0 14
NY:BUFFALO	8/ 2/82	1.22 0.21	1 15	-6 19	-9 13
NY:NEW YORK CITY	8/ 2/82	1.81 0.17	-3 11	4 14	5 10
NY:SYRACUSE	8/ 6/82	1.56 0.24	15 16	7 20	-4 14
OH:CINCINNATI	8/ 3/82	1.27 0.15	5 11	-18 13	-6 9
OH:CLEVELAND	8/ 9/82	1.68 0.24	-4 15	15 20	0 14

TABLE 15 (CONTINUED)

CONCENTRATIONS OF RADIONUCLIDES IN PASTEURIZED MILK

AUGUST 1982

LOCATION	DATE COLLECTED	K g/1+2s	^{137}Cs pCi/1+2s	^{140}Ba pCi/1+2s	^{131}I pCi/1+2s
OK:OKLAHOMA CITY	8/ 2/82	1.68 0.17	11 11	6 14	1 10
OR:PORTLAND	8/ 9/82	1.85 0.25	14 16	-1 20	7 14
PA:PHILADELPHIA	8/ 2/82	1.35 0.22	-6 14	-20 19	-3 13
PA:PITTSBURGH	8/ 4/82	1.68 0.17	9 15	5 14	-10 10
PC:ANCON	8/20/82	1.84 0.25	33 16	-2 20	-6 14
PR:SAN JUAN	8/13/82	1.88 0.25	1 15	6 20	8 14
SC:CHARLESTON	8/19/82	1.85 0.25	13 16	15 20	6 14
SD:RAPID CITY	8/ 5/82	1.65 0.17	10 11	-3 14	-6 10
TN:CHATTANOOGA	8/ 2/82	1.83 0.25	11 15	-7 20	1 14
TN:KNOXVILLE	8/ 9/82	1.49 0.24	8 15	0 20	7 14
TN:MEMPHIS	8/26/82	1.83 0.24	1 15	-13 20	-1 14
TX:AUSTIN	8/16/82	1.71 0.24	12 15	-13 20	-9 14
UT:SALT LAKE CITY	8/ 2/82	1.65 0.22	10 15	-14 19	3 13
VA:NORFOLK	8/13/82	1.81 0.25	-1 15	11 20	-1 14
VT:BURLINGTON	8/ 9/82	1.57 0.24	7 15	3 20	-7 14
WA:SPOKANE	8/ 1/82	1.43 0.22	-1 15	-27 19	-1 13
WI:MILWAUKEE	8/ 5/82	1.84 0.25	4 15	-8 20	0 14
WV:CHARLESTON	8/10/82	1.70 0.24	20 16	8 20	-12 14
WY:LARAMIE	8/ 2/82	1.37 0.22	9 15	-26 19	5 13

s SIGMA COUNTING ERROR

TABLE 16

CONCENTRATIONS OF RADIONUCLIDES IN PASTEURIZED MILK

SEPTEMBER 1982

LOCATION	DATE COLLECTED	K g/l±2s	^{137}Cs pCi/l±2s	^{140}Ba pCi/l±2s	^{131}I pCi/l±2s
AL:MONTGOMERY	9/ 9/82	1.75 0.24	14 16	8 20	11 14
AR:LITTLE ROCK	9/ 7/82	1.70 0.24	9 15	6 20	-2 14
AZ:PHOENIX	9/ 7/82	1.87 0.25	3 15	-6 20	1 14
CA:SAN FRANCISCO	9/ 8/82	1.76 0.24	14 16	1 20	-4 14
CT:HARTFORD	9/ 7/82	1.42 0.24	12 15	2 20	-1 14
DC:WASHINGTON	9/ 3/82	1.98 0.25	6 15	7 20	6 14
DE:WILMINGTON	9/ 8/82	1.85 0.25	7 15	10 20	1 14
HI:HONOLULU	9/ 7/82	1.91 0.18	7 11	-2 14	-5 10
IA:DES MOINES	9/ 7/82	1.69 0.24	2 15	6 20	4 14
ID:IDAHO FALLS	9/ 2/82	1.70 0.24	6 15	12 20	6 14
IL:CHICAGO	9/ 7/82	1.75 0.24	0 15	9 20	3 14
IN:INDIANAPOLIS	9/ 7/82	1.68 0.24	11 15	-1 20	-2 14
KS:WICHITA	9/ 1/82	1.85 0.25	10 15	-4 20	-4 14
KY:LOUISVILLE	9/ 7/82	1.67 0.24	9 15	8 20	-3 14
MD:BALTIMORE	9/ 3/82	1.93 0.18	9 11	-2 14	0 10
ME:PORTLAND	9/ 8/82	1.69 0.24	8 15	13 20	-3 14
MI:DETROIT	9/ 9/82	1.72 0.17	4 11	16 14	0 10
MI:GRAND RAPIDS	9/ 7/82	1.67 0.24	13 16	12 20	5 14
MN:MINNEAPOLIS	9/13/82	1.85 0.25	8 15	-9 20	-4 14
MN:ST PAUL	9/ 1/82	1.79 0.24	2 15	12 20	-4 14
MO:KANSAS CITY	9/10/82	1.86 0.17	12 11	12 15	10 10
MS:JACKSON	9/ 7/82	1.96 0.25	11 15	-6 20	0 14
MT:HELENA	9/ 7/82	1.70 0.24	15 16	9 20	6 14
NC:CHARLOTTE	9/13/82	1.75 0.17	18 11	-4 14	-5 10
ND:MINOT	9/ 7/82	1.60 0.17	8 11	9 14	-2 10
NE:OMAHA	9/10/82	1.47 0.24	3 15	12 20	-1 14
NH:MANCHESTER	9/ 7/82	1.88 0.25	5 15	2 20	2 14
NJ:TRENTON	9/ 2/82	1.76 0.24	12 16	9 20	0 14
NY:BUFFALO	9/13/82	1.70 0.24	8 15	10 20	-2 14
NY:NEW YORK CITY	9/13/82	1.70 0.24	10 16	20 20	-5 14
NY:SYRACUSE	9/ 7/82	1.88 0.25	2 15	12 20	-3 14
OH:CINCINNATI	9/13/82	1.62 0.24	16 16	9 20	3 14
OH:CLEVELAND	9/ 7/82	1.84 0.25	7 15	4 20	-4 14
OK:OKLAHOMA CITY	9/13/82	1.99 0.25	4 15	6 20	3 14
OR:PORTLAND	9/ 7/82	1.70 0.24	9 15	5 20	7 14
PA:PITTSBURGH	9/ 8/82	1.84 0.24	10 15	-11 20	3 14
SC:CHARLESTON	9/27/82	1.90 0.25	12 16	1 20	7 14
SD:RAPID CITY	9/ 9/82	1.76 0.24	15 16	4 20	4 14
TN:CHATTANOOGA	9/ 6/82	1.79 0.24	8 15	3 20	-10 14
TN:KNOXVILLE	9/13/82	1.69 0.24	12 16	8 20	3 14
TX:AUSTIN	9/ 8/82	1.83 0.25	3 15	10 20	11 14
UT:SALT LAKE CITY	9/ 6/82	1.75 0.24	6 15	-1 20	-1 14
VA:NORFOLK	9/10/82	1.63 0.17	17 11	-2 14	2 10
VT:BURLINGTON	9/ 3/82	1.70 0.17	12 11	0 14	0 10
WA:SEATTLE	9/ 7/82	1.90 0.25	6 15	16 20	-1 14
WA:SPOKANE	9/ 7/82	1.71 0.24	18 16	4 20	0 14
WI:MILWAUKEE	9/ 1/82	1.80 0.25	5 15	11 20	-9 14
WY:LARAMIE	9/ 9/82	1.71 0.17	12 11	19 14	-2 10

s SIGMA COUNTING ERROR

TABLE 17

STRONTIUM-90 AND STRONTIUM-89 IN PASTEURIZED MILK

JULY - SEPTEMBER 1982

EPA LOCATION		^{90}Sr pCi/l ± 2s		^{89}Sr pCi/l ± 2s*	
AK:ANCHORAGE	7/ 1/82	2.3	1.0	-1	3
AL:MONTGOMERY	7/ 8/82	2.3	1.1	1	2
AR:LITTLE ROCK	7/ 6/82	2.9	1.0	-1	2
AZ:PHOENIX	7/ 8/82	0.9	0.9	0	1
CA:LOS ANGELES	7/23/82	0.6	0.8	1	2
CA:SACRAMENTO	7/ 1/82	1.3	1.0	0	2
CA:SAN FRANCISCO	7/ 8/82	0.9	0.7	0	1
CO:DENVER	7/27/82	3.1	1.2	1	2
CT:HARTFORD	7/ 6/82	3.6	1.1	-1	3
DC:WASHINGTON	7/ 2/82	2.9	1.0	0	3
DE:WILMINGTON	7/ 7/82	2.4	1.2	2	2
FL:TAMPA	7/ 6/82	2.4	0.9	0	1
GA:ATLANTA	8/ 2/82	2.7	0.9	0	2
HI:HONOLULU	7/ 6/82	1.3	0.7	0	1
IA:DES MOINES	7/12/82	2.4	1.0	1	1
ID:IDAHO FALLS	7/ 7/82	1.4	1.0	1	2
IL:CHICAGO	7/12/82	3.8	1.1	0	2
IN:INDIANAPOLIS	7/ 6/82	2.1	1.0	2	1
KS:WICHITA	7/ 8/82	2.8	1.1	1	2
KY:LOUISVILLE	7/ 6/82	4.2	1.1	0	2
LA:NEW ORLEANS	8/ 4/82	4.0	1.4	2	2
MA:BOSTON	7/13/82	3.8	1.2	1	2
MD:BALTIMORE	7/ 2/82	2.2	1.0	1	2
ME:PORTLAND	7/ 8/82	3.5	1.5	2	4
MI:DETROIT	7/ 8/82	3.8	1.1	0	2
MI:GRAND RAPIDS	7/12/82	4.0	1.3	0	2
MN:MINNEAPOLIS	8/ 2/82	3.6	1.3	1	2
MO:KANSAS CITY	7/ 9/82	3.5	1.2	0	2
MO:ST LOUIS	7/ 7/82	3.0	1.2	0	2
MS:JACKSON	7/ 7/82	3.9	1.3	1	3
MT:HELENA	7/ 6/82	2.6	0.9	-1	2
NC:CHARLOTTE	7/ 6/82	3.8	1.1	0	3
ND:MINOT	7/ 6/82	3.5	1.0	0	2
NE:OMAHA	7/ 9/82	1.5	1.0	2	2
NH:MANCHESTER	7/ 6/82	2.3	1.1	3	2
NJ:TRENTON	7/ 1/82	3.4	1.1	0	3
NM:ALBUQUERQUE	7/ 6/82	0.7	0.9	1	1
NV:LAS VEGAS	7/ 6/82	0.7	0.7	0	1
NY:BUFFALO	7/12/82	3.5	1.0	0	1
NY:NEW YORK CITY	7/12/82	3.1	1.2	2	2
NY:SYRACUSE	7/ 8/82	3.9	1.3	1	2
OH:CINCINNATI	7/12/82	2.0	1.1	2	2
OH:CLEVELAND	7/ 7/82	3.3	1.1	0	2
OK:OKLAHOMA CITY	7/ 6/82	2.7	0.9	0	1
OR:PORTLAND	7/ 6/82	1.2	1.0	3	2
PA:PHILADELPHIA	7/ 6/82	3.9	1.3	1	3

TABLE 17 (CONTINUED)

STRONTIUM-90 AND STRONTIUM-89 IN PASTEURIZED MILK

JULY - SEPTEMBER 1982

EPA LOCATION		^{90}Sr pCi/l ± 2s		^{89}Sr pCi/l ± 2s*	
PA:PITTSBURGH	7/ 7/82	2.8	1.2	4	2
PC:ANCON	7/22/82	1.5	0.8	0	2
PR:SAN JUAN	7/22/82	0.3	1.0	2	2
SC:CHARLESTON	7/22/82	3.2	1.1	0	2
SD:RAPID CITY	7/ 8/82	3.4	1.1	1	2
TN:CHATTANOOGA	7/ 6/82	4.2	1.3	0	3
TN:KNOXVILLE	7/ 6/82	4.1	1.2	0	2
TN:MEMPHIS	7/29/82	1.3	1.4	1	2
TX:AUSTIN	7/15/82	3.0	1.0	-1	2
UT:SALT LAKE CITY	7/ 6/82	2.4	0.8	-1	1
VA:NORFOLK	7/19/82	2.7	1.2	1	2
VT:BURLINGTON	7/12/82	5.6	1.4	2	3
WA:SEATTLE	7/30/82	2.9	1.4	0	2
WA:SPOKANE	7/ 6/82	2.4	1.0	2	1
WI:MILWAUKEE	7/ 6/82	3.2	1.1	0	3
WV:CHARLESTON	7/ 7/82	3.2	1.1	0	2
WY:LARAMIE	7/ 7/82	1.8	1.0	0	2

s SIGMA COUNTING ERROR
s* ANALYTICAL ERROR TERM WHICH CLOSELY APPROXIMATES THE COUNTING ERROR

Carbon-14 in Milk

Nine stations, chosen for wide geographical distribution, contribute milk samples for annual analysis for carbon-14. These samples have monitored the carbon-14 levels in the food chain resulting from nuclear testing.

Analysis consists of combusting the samples and measuring released carbon dioxide through liquid scintillation.

Data will be published as it becomes available.

Radiological Health Laboratory
Indiana State Board of Health

Indiana Milk Analysis Program

In order to evaluate the fallout on Indiana pasturelands, the State has implemented a program whereby monthly milk samples from five geographical areas are sent to the Radiological Health Laboratory of the State Board of Health. The milk in these samples is bottled on the same date in all five areas to provide uniform time from pasture to the lab.

Once in the laboratory, the milk is first analyzed by gamma spectroscopy for iodine-131, barium-140, cesium-137, and potassium-40. A one gallon sample is analyzed on a 3" x 3" NaI(Tl) scintillation crystal for 4800 seconds. A background sample of 48,000 seconds is also run. The data are analyzed to give pCi/l for each radionuclide.

A quarterly composite sample is saved and run for strontium-89 and -90 by ion exchange method.

Data will be published as it is received.

Radiological Health Division
State Hygienic Laboratory of Iowa

Iowa Water Sampling Program

The radiological Health Division of the State Hygienic Laboratory of Iowa with the assistance of the State Department of Environmental Quality (DEQ) maintains a state-wide water sampling program of community drinking waters, surface waters and precipitation. All analyses with the exception of the sequential Ra-226, -228 analyses are performed according to "Standard Methods for the Examination of Water and Wastewater", 14th edition. The sequential analyses for radiums are performed according to the EPA publication, EPA-600/4-75-008, "Interim Radiochemical Methodology for Drinking Water."

The drinking water samples are collected by DEQ regional personnel and sent to the State Hygienic Laboratory where they are preserved with HCl. These waters are analyzed for gross alpha and gross beta radioactivity as a screening process. Subsequent analyses for Ra-226, Ra-228, Sr-90 are performed if screening levels are exceeded. Radium levels are of primary concern in Iowa drinking waters as those levels are elevated in deep geologic aquifers within the state.

Surface waters are collected at eleven sites throughout the state with site selection being determined by proximity upstream and downstream to nuclear power plants in Iowa or those plants discharging into rivers which are natural borders with adjoining states. Gross alpha, gross beta, and tritium are the routine radionuclide analyses for these samples. Strontium is of interest when gross beta screening levels are exceeded or if nuclear weapons testing necessitates monitoring to determine its impact on the environment.

Data will be published as it is received.

ENVIRONMENTAL RADIATION DATA (ERD) is published quarterly (January, April, July, October) by the U. S. Environmental Protection Agency's office of Radiation Programs.

Requests for information concerning publication and distribution of ERD should be directed to:

Charles M. Petko
Technical Support Branch
Eastern Environmental Radiation Facility
P. O. Box 3009
Montgomery, Alabama 36193

Requests for information concerning the operation of ERAMS should be directed to:

H. Michael Mardis, Chief
Monitoring and Analytical Services Branch
Eastern Environmental Radiation Facility
P. O. Box 3009
Montgomery, Alabama 36193

or to:

Lewis Battist, Chief
Environmental Studies and Statistics
Analysis and Support Division (ANR-461)
U. S. Environmental Protection Agency
Waterside Mall East
401 M Street, SW
Washington, DC 20460

***